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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Alvin L. Neeley, et al. ) ArtUnit: 3652  
Serial No. 09/440,149 ) Examiner: Underwood, D.  
Filed: November 15, 1999 )  
For: MANHOLE COVER LIFTING ) Attorney  
APPARATUS AND METHOD ) Ref. No.: P112554

The Honorable Commissioner  
U.S. Patent and Trademark Office  
Washington, D.C. 20231

Certificate of Mailing (37 CFR 1.8a)

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**APPEAL BRIEF**

The Notice of Appeal was filed on this last October 15, 2002. This Appeal Brief was due on December 14, 2002. A one-month extension of time is requested to make this Appeal Brief due on January 14, 2003. A check in the amount of \$55.00 is enclosed in payment of the extension fee. An earlier Notice of Appeal was filed on May 10, 2001, and the Appeal Brief was filed on September 10, 2001, with a two-month extension requested. However, <sup>an Examiner's answer</sup> a Reply Brief was not received, and instead the Examiner withdrew the finality of Paper No. 13 and issued a new Office Action which was mailed on December 14, 2001, rejecting all of the claims on the basis of a newly founded U.K. patent application 2,045,206. A response was filed on April 15, 2002, and an Office Action finally rejecting the claims was mailed on July 16, 2002. Since an earlier Brief was filed and a check in the amount of \$155.00 was already made in payment of the fee for filing the Brief in support of the Appeal, it is believed that no fee is due at this time in filing this Appeal Brief. However, if that fee for filing the Appeal Brief is

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due, or if there is any other fee due to maintain the application in full force and effect, please charge this to Account No. 08-3260.

I. PARTY IN INTEREST.

The sole owners of this patent application are the applicants, namely, Mr. Alvin L. Neeley and Mr. Steven M. Davis.

II. RELATED APPEALS AND INTERFERENCES.

The applicants are unaware of any other appeals or interferences that would have any effect or have any bearing on the board's decision in this appeal.

III. STATUS OF THE CLAIMS.

The claims presently on Appeal are claims 1, 3-9 and 13. The rest of the claims have been withdrawn from consideration except for claims 10 and 21. Claim 10 was objected to as depending from a non-allowed claim, but was indicated as having allowable subject matter. Claim 21 is an independent claim which contains the same subject matter as claim 10, and has been allowed. Accordingly, the Applicant's attorney intends to cancel claim 10 at such time as the application is returned to the Examiner for further handling, and Claim 21 remains as an allowed claim.

The present application was filed as a continuing prosecution application on November 15, 2000, and this was filed with a preliminary amendment amending claim 1, cancelling claim 2, making some minor amendments, and adding a new independent claim 21.

On February 12, 2001, a final rejection was issued. In that action, claims 11, 12, and 14 – 20 were withdrawn from consideration. Claim 21 was allowed. Claims 1, 3-9, and 13 were rejected on the basis of prior art. Claim 10 was objected to as being dependent upon a rejected claim.

A first Notice of Appeal was filed on May 10, 2001, and the Appeal Brief was filed on September 10, 2001. However, the Examiner withdrew the final objection and sent an Office Action on December 14, 2001, again rejecting the claims and citing a new reference, namely, U.K. patent application 2,045,206. A response was mailed on April 14, 2002, and a final rejection was made in the Office Action mailed July 16, 2002. In that last Office Action, all of the claims were rejected as follows:

- i) Claims 1, 3, 4, 7-9, and 13 were rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.K. patent application 2,045,206;
- ii) Claims 1-9 and 13 were rejected under 35 U.S.C. 102(e) as being clearly anticipated by Eckloff et al. (U.S. 5,674,045);
- iii) Claims 1-9 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over the U.K. patent application 2,045,206, or Schmitz (U.S. 5,035,336) in view of Schaller (U.S. 4,662,526);
- iv) Claims 1-9 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over British reference 2,111,017 in view of Schaller; and

- v) Claim 10 was objected to as being dependent upon a rejected base claim but would be found allowable if written in independent form, and Claim 21 was allowed.

#### IV. STATUS OF AMENDMENTS.

No amendments have been filed subsequent to the final rejection.

#### V. SUMMARY OF THE INVENTION.

The present invention relates to a lifting assembly 10 (page 9, line 15) to lift an object such as a manhole cover 12 (page 13, line 17) that comprises a beam structure (the lifting bar 20) (page 9, line 26) with a pivot end 24 (page 9, line 32) and a mobile end 26 (page 9, line 32).

There is a pivot support (the post 28) (page 10, line 5) connected to the beam structure 20 at the pivot end at a substantially stationary base surface pivot location (at the lower engaging end 32) (page 10, line 32). There is the mobile support member 34 (page 10, line 27) having a mobile base surface engaging portion (the ground engaging wheels 40) (page 10, line 31).

The lifting mechanism 18 (page 9, line 25) is mounted to the beam structure (the lifting bar 20) between the pivot support 28 and the mobile support 34. Further, the lifting mechanism 18 comprises a lift connection (lift attachment 62--page 12, line 27) and an actuator (the lifting mechanism 18 which in turn comprises the actuating rod 64 and the actuating crank 66) (page 12, lines 29 and 30).

Thus, the lifting assembly can be positioned over the object (the manhole cover) with a pivot support 28 being on one side of the manhole cover 12 and the mobile support 34 comprising the wheels 40 being on the opposite side of the manhole cover. The lifting mechanism 18 is able to raise the manhole cover 12, and the mobile support 34 is moved laterally in a circular path about the pivot support to move the manhole cover 12 away from the manhole opening, and then move the manhole cover back along the same circular path about the same circular path about the same pivot location so that the manhole cover automatically comes back to its original position. It should be noted that the lifting assembly 10 is constrained to move on the same circular path about the pivot support 28.

The mode of operation of the present invention can easily be seen from viewing figures 1, 2A-C, and claims 3A-B. The assembly 10 is placed over the manhole cover 12 with the pivot post 28 on one side of the manhole cover 12 and the mobile wheeled member 34-40 being on the opposite side of the manhole member 12. The connector 62 is inserted through the manhole cover opening and the connection is made (see Fig. 2A). Then the crank handle 66 is rotated to move the manhole cover 12 upwardly (see Figs. 2B and 2C). Then the mobile end of the lifting assembly 10 is pulled laterally to move the manhole cover in a circular path from the position of Fig. 3A to the position of Fig. 3B. To replace the manhole cover 12, the reverse operation follows (i.e. moving a manhole cover 12 back over the manhole, and then lowering the manhole cover 12).

The main benefits of the present invention in alleviating the back injuries is that the workman needs only to rotate the crank 66 to raise the manhole cover, and then from an upright position attach a T-hook or a line to the mobile end of the bar and pull sideways from an upright position.

Also, by having the pivot support (i.e., the post 28) at a substantially stationary base surface location, when the manhole cover is moved back to its original position, the cover is automatically in proper alignment with the manhole cover.

## VI. ISSUES.

The issues are the following:

- a) Whether the Eckloff et al. patent (U.S. 5,674,045) should be applied as prior art under 35 U.S.C. 102 (e) to reject the Claims 1-9 and 13, in view of the fact that during the prosecution of the application the Applicants have submitted clear proof under Rule 131 that date of invention in the present application was clearly established well before the filing date of the Eckloff et al patent;
- b) Whether Claims 1, 3, 4, 7-9, and 13 should be rejected under 35 U.S.C. 102(b) as being anticipated by U.K. patent application 2,045,206;
- c) Whether Claims 1-9 and 13 should be rejected under 35 U.S.C. 103(a) as being unpatentable over U.K. patent application 2,045,206 in view of Schaller (U.S. 4,662,526);
- d) Whether Claims 1-9 and 13 should be rejected under 35 U.S.C. 103(a) over Schmitz (U.S. 5,035,336) in view of Schaller (U.S. 4,662,526);

- e) Whether Claims 1-9 and 13 should be rejected under 35 U.S.C. 103(a) as being unpatentable over British reference 2,111,017 in view of Schaller.

## VII. GROUPING OF THE CLAIMS.

Claims 1, 3, and 13 comprise one group of claims which should rise or fall together.

Claims 4 and 5 are a second group of claims which should be considered together.

Claim 6 should stand by itself, and the prior art simply does not show this element.

Claims 7-9 stand as a group.

## VIII. ARGUMENTS

### 1. The Problem Solved By The Present Invention.

The problem is the high number of back injuries occurring in the electric utility industry (and other related industries, such as water supply, sewer systems, etc.) that result from the present system of removing and replacing manhole covers (also called "vault covers"). The present commonly used method is primarily a manual operation, using handheld tools by which the workers themselves apply the physical lifting force. Further, the apparatus must be convenient and "user friendly" for the workmen to accept it. While there have been attempts in the past several decades to provide an acceptable tool to remove and replace the manhole cover mechanically, to the best knowledge of the Applicants, none of these have been adopted to

any significant extent, or not at all. The present injury-prone method still predominates.

a)     Introductory Comments.

Probably the easiest way for the reader to get a “hands on” understanding is to review the four-page declaration of Mr. Ed Mecum, a Seattle City Light employee for the last 29 years. For the convenience of the reader, certain excerpts are printed below from Mr. Mecum’s Declaration, these being indicated by the page and line location:

i)     Getting to the Job Site

This is discussed in page 1, section 2, of Mr. Macem’s declaration as follows:

“In Seattle City Light there are commonly three men on such a crew. In a normal day’s work, the three people in the crew would ride in a van to one or more job sites where there is a vault, with most of these being an underground vault with a vault cover or lid. Our van would be a little bit smaller than a UPS truck and would be loaded so that the total load with various equipment, such as splicing equipment, ladders, safety equipment, etc., generally takes up most all of the room in the truck. At the job site the helper would normally set up the metal barriers and fences around the manhole cover (vault lid). The manhole cover would be removed from its



position covering the vault opening, and then one or more of the workmen would go downwardly through the vault into the vault area to perform the work.”

ii) The Method of Removing the Manhole Cover (i.e. the Vault Lid).

This is described in Section 3 of Mr. Macem’s declaration as follows:

“Quite often, the manhole covers are located on a roadway (generally paved roadway) and a typical manhole cover could be about 42” in diameter and weigh 400 pounds or possibly less for a smaller vault lid. One typical way of lifting a manhole cover from its closing position is to connect a city hook to the sides of the manhole cover. This city hook has an end hooking member and a rod or bar about  $\frac{3}{4}$ ” in diameter and about 2  $\frac{1}{2}$  feet long. At the top of the bar there is a cross handle (so that the bar and the handle has an overall T-shape). One man would be on one side of the manhole cover and one on the other, and both would lift on the T-bar to lift the cover out of the vault opening. The two men raise the manhole cover about two inches above the surrounding street surface and then move the

manhole cover sideways to let it rest on the surface.”

Page 2, Section 4.

“In some instances, the manhole cover is “stuck” in the opening. This could happen, for example, when the street has been paved or re-paved and the paving material has worked in around the edges of the manhole cover. When this happens, it is common for the worker to use a sledgehammer and beat on the manhole cover until it is loose. Then the same lifting operation is employed.”

2. How Long Has The Currently Used Method Of Removing And Replacing Manhole Covers Been In Existence?

Mr. Macem has been employed by Seattle City Light since 1972 and states that the same method of using manual tools has been in existence since then, and probably long before that. More specifically, in section 5 of his declaration he states the following:

“This general system of lifting the manhole covers has been used by Seattle City Light ever since I began working there, and to the best of my knowledge this is generally the same system that is used throughout the industry. ... Again, to the best of my knowledge, these have been in existence when

underground electrical distribution networks have been used, and these have been in existence for about the last 90 years.”

3. What Other Methods Have Been Tried?

a) On page 3, section 6, Mr. Macem states the following:

“Other methods have been tried, such as attaching a fulcrum or other member to a lid to the manhole cover and providing some sort of handle for lifting it. However, to the best of my knowledge, a manual operation where the worker lifts the manhole cover above the hole by pulling upwardly on a handle or other device remains the commonly used method of removing manhole covers. With a 400-pound lid, the two workmen would each be exerting an upward pull of about 200 pounds (somewhat more if the lid is stuck in some manner).”

b) The attached declaration of Mr. Davis, one of the co-inventors, states the following:

“Due to the substantial physical challenges of manually lifting and handling vault lids using those methods, various automated or semi-automated mechanical lifting devices devised, such as truck lift using the power of the truck and a Lanyard, a Quinn Roller Block which is a leverage device, or any other leverage bar device having been designed and integrated in utility work. However, these have not been widely accepted due to awkwardness and/or inability to be consistently used in all

situations, and vault lid removal is still predominantly manually performed.”

4. The Physical Effects Of Repeatedly Lifting Vault Lids With The Existing Manual Method.

This is discussed in Mr. Davis’ Declaration on page 4, Section 7. In section 7 of his declaration, Mr. Davis discusses the resulting back injuries. It should be noted that Mr. Davis has a strong academic background in this particular technology (see section 2 of his declaration giving his credentials), and has studied this problem for a number of years.

“In general, on a statistical basis, a large percentage of occupational injuries resulting from physically demanding work are strain/sprain type back injuries. These commonly occur when a person is performing a lifting motion, and particularly when the lifting movement involves not just a straightforward lifting motion with a relatively safe load, but where the lifting motion is accompanied by the person being in an unbalanced position, and/or conducting the lifting motion where there are lateral or twisting forces coupled with high lifting and pulling forces. I have analyzed the biomechanics of lifting when workmen manually remove and replace vault covers, and I find the following:

- i) the lifting of vault lids can require an awkward unbalanced stance;
- ii) excessive forward bending (awkward lifting postures) coupled with extreme lifting requirements increases spinal disc pressures particularly at L4-L5. These lifting demands require high force output from the back musculature including the erector spinal muscles, which

are more endurance muscles than power muscles.  
These demands often far exceed maximal permissible  
load limits and recommended load limits for the back;

- iii) frequent unstable footing when lifting, pulling and  
dragging vault lids.

Continually performing this type of physically demanding  
work significantly increases the likelihood of a serious  
cumulative work related musculoskeletal disorder  
(WMSD) affecting the back and/or other musculoskeletal  
joints including the knees, shoulders, etc. In general,  
even if the best and safest lifting postures and techniques  
are assumed when lifting vault lids, the physical  
requirements and absolute demands significantly  
increases the risk for severe injuries.”

Then we also have the comments provided by Mr. Macem  
that appear on page 4, section 10 of his declaration.

These are as follows:

“Mr. Hughes has also asked me to comment in my  
statement that this could drastically reduce the risk  
of back injuries. While I can’t give hard statistics on  
this, on the basis of my experience in my jobs for  
Seattle City Light, at least half of people on the crew  
(probably a lot more) have some sort of back  
problems. The lifting and removal of vault lids is  
one of the jobs that probably places as much strain

on the person's back as any other job that we do. Quite often a person on the crew (particularly a younger person) will take the lifting of the vault cover as a physical challenge and do the lifting in the usual way. However, after a person has sustained a back injury, if he can be provided with a tool that would reduce the odds of re-injuring the back, this tool would be a real help."

5. The Basic Structure And Operation Of The Present Invention.

This is immediately understandable by viewing the following figures:

- i) Fig. 1 shows the entire apparatus in its position, ready to lift the manhole lid (vault cover).
- ii) Figs. 2A-2B show the sequence of lifting the vault lid upwardly.
- iii) Figs. 3A and 3B show a top plan view, showing the vault lid 12 being moved off to one side from the manhole cover 14.

There are several significant things to note in the operation of this apparatus, namely:

- a) The lifting force is done mechanically, and in this preferred embodiment is accomplished by a lifting jack (specifically comprising a hand crank).

A person using only four to eleven pounds of hand-arm force could accomplish a 900-pound lift. If the lifting force

needs to exceed 900 pounds, a ratchet device could be used along with the lifting tool.

- b) To move the manhole cover laterally, the workman can roll the manhole cover laterally while remaining in an upright position, simply by taking a T-bar hook and move the hook to engage an eyebolt 51 and pull this laterally while the workman is a more upright position.
- c) Since the pivot post 28 remains at a substantially fixed position, it makes it very easy to replace a manhole cover simply by moving the mobile end (i.e. where the wheels 40 are located) back to its original location shown in Fig. 3A, and then use the jack to lower the manhole cover into place.

6. The Present Invention Alleviates (or Substantially Eliminates) the Risk of Back Injury.

In section 8 (page 5) of the declaration of Mr. Davis, he summarizes the benefits of the invention as follows:

“I have performed a similar analysis relating to the physical motion of the workmen in utilizing the present application. When using the vault lid lifting tool, which is shown and claimed in the present invention, the risk for cumulative types of musculoskeletal injuries is virtually eliminated. There is no awkward lifting, dragging the vault lid or excessive force requirements. The tool is easily and efficiently operated so that

when the person is exerting any force, he is standing in a fully upright position. The lid is easily lifted using a hand crank or screw gun coupled with a lifting jack affixed to a horizontal frame over the lid. The lid is lifted quickly using 4-11 pounds of hand arm force for up to a 900 pound lift. A ratchet device can be used along with the tool if lifting force exceeds 900 pounds. Because the person can operate the tool in an upright position and hand/arm force requirements are minimal, footing is always stable. Once the lid is lifted using this tool, the lid is rolled out of the way (one hundred and eighty degrees) to access the underground vault. This can also be accomplished with the person being in an upright position. When done, the tool is rolled one hundred eighty degrees back to its original spot and the lid is replaced directly into the vault access hole. No lifting or dragging is required in either case."

7. How the Present Invention Solves The Problem Of The Reluctance Of Workers In The Electric Utilities Industry From Accepting The Prior Art Solutions. (The "User-Friendly" Aspects Of The Present Invention).

It would seem puzzling that some sort of power-driven lifting device has not become widely used in the removal and replacement of manhole covers. This was discussed by the applicant's attorney with Mr. Macem who has had 29 years' experience in this industry. Mr. Macem had used the tool of the present invention on a trial basis in 1994, and his memorandum report to Mr. Davis, one of the co-inventors, is attached to



Mr. Macem's declaration. Mr. Macem's report was very positive. Further, he made some recommendations that the tool should be mounted on the rear end of the truck so that it would be easily available and would encourage a crew to use it. He also states that mounting a tool in a handy location would encourage its constant use and make it more user-friendly as a crew becomes accustomed to it. The applicant's attorney, the undersigned, questioned Mr. Macem further on this, and enclosed were the following comments from his attached declaration:

"I have also been asked by Mr. Hughes to comment on the statement which I had made that mounting this tool in a handy location would encourage its constant use and make it more user friendly as the crew becomes accustomed to it. To explain this further, if there are inconveniences or time delays in trying to get a piece of equipment set up, or if it is awkward to handle, the person on the crew is likely not going to take the trouble to use it but simply go back to the tried and true way of using the hook, even though it does put strain on the person's back. Also, the equipment has to be easily accessible. This is why I suggested in my letter that the main part of the tool could be mounted to the front exterior of the truck and the miscellaneous pieces be placed in a small box attached to the inside of the rear door. This tool can be set up very quickly, and it is very simple to use. Further, there is the convenience that after the tool is used to move the vault lid off to the side, then the replacement becomes very easy since its just the reverse operation of moving the tool about a pivot point back over the vault lid opening."

Attached to this appeal brief appendix, the three declarations that were submitted in the prosecution of the above application, namely:

- i) The declaration of Ed Maccomb, signed May 15, 2000;
- ii) A first declaration of Steven Davis, comprising three pages of text and five pages of an attachment, thus documenting the completion of the invention on or before January 11, 1994; and
- iii) A second declaration of Steven Davis, along with four pages of drawings, documenting various background information and features of the present invention relative to its benefits.

8. Why the Eckloff et al Patent (U.S. 5,674,045) Should Be Removed As Prior Art, and The Rule 131 Affidavit Should Be Accepted.

This patent was cited by the Examiner in one of the earlier parent applications. A Rule 131 Affidavit was submitted in an earlier amendment, clearly establishing the completion of the present invention well before the filing date of the Eckloff et al patent.

More specifically, the Declaration of Mr. Steve Davis, signed May 15, 2000, along with the supporting documentation, clearly demonstrated that the apparatus of the present invention is fully completed at least as early as January 11, 1994, some ten months prior to the October 11, 1994 filing date of the Eckloff et al patent application. Accordingly, it was requested that under Rule 131, the Eckloff et al patent should be removed as a prior art reference. However, the Examiner has taken the position that it is not possible to swear behind the Eckloff et al patent by means of a Rule 131 affidavit, and that the only course of action would be to initiate an

interference proceeding. Accordingly, in the final action dated this July 16, 2002, the Examiner rejected the position of the Applicants that the Eckloff et al patent should be not removed as a reference with the following language:

"Applicant's position regarding Eckloff et al have been carefully considered but are not deemed persuasive in view of 37 CFR 1.601(n) where applicant's invention is invention A and Eckloff et al is invention B."

As a preliminary comment, there are three facts that should be made clear, these being the following:

- i) the apparatus in the Eckloff et al patent is sufficiently close to the present patent application under appeal, so that if the Eckloff et al patent is applied as a prior art reference under 35 U.S.C. 102(e), at least the broader claims under appeal would be unpatentable;
- ii) the claims of the Eckloff et al patent are directed towards specific mechanical features which are not even shown in the disclosure of the present patent application, and there is no way that the present Applicants could copy the claims of the Eckloff et al patent, if this application were to be involved in an interference proceeding with Eckloff et al;
- iii) the Applicants in the present application readily admit that the claims of the Eckloff et al patent are patentably distinct from the disclosure of the present invention and are patentable over the present invention, so that Eckloff

et al are entitled to their patent with its present claims even if the Applicants in the present invention could clearly establish earlier inventorship in an interference proceeding.

It is submitted that with this fact pattern being present, it is quite clear that the present Applicants are entitled to swear behind the filing date of the Eckloff et al patent, and have it removed as a reference under 35 U.S.C. 102(e). The merits of this position to establish a proper interpretation of Rule 131 will be given first. Then, after that there will be a more detailed discussion of the claims of the Eckloff et al patent to make it clear that the three "facts" which are stated immediately above are established as being factual.

a) Whether The Legal Issues As To Whether The Rule 1.131 Affidavit Should Be Accepted.

The language of Rule 1.131 that is relevant to this issue appears in the first full paragraph of Rule 1.131, paragraph (a)(1) as follows:

"When any claim of an application or a patent under reexamination is rejected under 35 U.S.C. 102(a) or (e), or 35 U.S.C. 103 based on a U.S. patent to another or others which is prior art under 35 U.S.C. 102(a) or (e) and which substantially shows or describes but does not claim the same patentable invention, as defined in §1.601(n), or on reference to a foreign patent or to a printed publication, the inventor of the subject matter of the rejected claim, the owner of the patent under reexamination, or the party qualified under §§1.42, 1.43, or

1.47, may submit an appropriate oath or declaration to overcome the patent or publication. The oath or declaration must include facts showing a completion of the invention in this country or in a NAFTA or WTO member country before the filing date of the application on which the U.S. patent issued, or before the date of the foreign patent, or before the date of the printed publication. When an appropriate oath or declaration is made, the patent or publication cited shall not bar the grant of a patent to the inventor or the confirmation of the patentability of the claims of the patent, unless the date of such patent or printed publication is more than one year prior to the date on which the inventor's or patent owner's application was filed in this country."

The language in the above given text clearly applies, in that the U.S. patent to Eckloff et al does substantially describe the broader claims of the patent application, but does not claim the same patentable invention.

Let us now turn our attention to Rule 1.601(n), where we find the following language:

"Invention 'A' is the same patentable invention as an invention 'B' when invention 'A' is the same as (35 U.S.C. 102) or is obvious (35 U.S.C. 103) in view of invention 'B' assuming invention 'B' is prior art with respect to invention 'A'. Invention 'A' is a separate patentable invention with respect to invention 'B' when invention 'A' is new (35 U.S.C. 102) and non-obvious (35 U.S.C. 103) in view of invention 'B' assuming invention 'B' is prior art with respect to invention 'A'.

It should be noted that beginning on line 5 of that paragraph, we have the following language, "...assuming invention 'B' is prior art with respect to invention 'A'." The Eckloff et al patent could be prior art as a patent under 35 U.S.C. 102(e) if it has a filing date in the United States prior to the invention by the Applicant. Therefore, if there is clear evidence that the Eckloff et al patent was not filed before the date of invention in the U.S. by the Applicants in the present patent application, it is not the "same invention" under Rule 1.601(n) simply because it cannot be assumed not to be prior art. Yet, the position taken by the Examiner is that the Applicants will not even be given the opportunity to submit evidence in any way that the date of invention of the Applicants, Neeley et al, is prior to the filing date of the Eckloff et al patent. This is rather circular reasoning. Let us look at the chain of events which would result if the Examiner's position is accepted:

- i) Inventors "A" complete their invention in January 1994;
- ii) Inventors "B" file their patent application in October 1994;
- iii) Inventors "A" file their patent application after October 1994;
- iv) Inventors "B" obtain an issued patent;
- v) The Examiner issues an action on the application of inventors "A" citing the issued patent of inventors "B";
- vi) The inventors "A" submit an Affidavit under Rule 131 establishing a date of invention earlier than the filing date of inventors "B";
- vii) The Examiner refuses to consider the Affidavit showing earlier invention under Rule 131 because the "claimed invention" in the patent application is the same "same

invention" as described and shown in inventors' "B" issued patent. Further, the Office takes the position that the invention that inventors "A" are trying to patent as described in the claims, is the same invention as in the patent of invention "B", since invention "A" is obvious under 35 U.S.C. 103 in view of invention "B", and apparently assuming that invention "B" is prior art with respect to invention "A".

Now, let us look at the practical effect of this. If you can file 131 Affidavit or Declaration to swear behind the prior patent only when your claimed subject matter is unobvious over the reference which you intend to swear behind, why even file a 131 Affidavit?" If the burden of proof for filing a 131 Affidavit is the same as establishing unobviousness, the Rule 131 Affidavit or Declaration becomes meaningless.

With all due respect to the Examiner's position, it is impossible for the Applicants' attorney, the undersigned herein, to see the logic in the position taken by the Examiner on behalf of the Office. Accordingly, again with all due respect to the Examiner's position, the undersigned would like to suggest what is believed to be a more reasonable approach in interpreting the language of Rule 131. The language of Rule 131 clearly states that the Rule 131 Affidavit applies when we have the situation that when there is a patent which is being applied as prior art under 102(a) or (e), and which substantially shows or describes but does not claim the same patentable invention. The Eckloff et al patent shows the subject matter of Claim 1, but it is also clear that it is not claiming the invention recited in any one of the claims presently on appeal. In fact, the claimed subject matter of the

Eckloff et al patent is sufficiently far removed from what is claimed and described in the present application so that the Applicants in the present application would not have sufficient foundation in their application to even make a claim anything close to what is claimed in the Eckloff et al patent. Further, as indicated above, the Applicants are fully prepared to admit that the inventors in the Eckloff et al patent are fully entitled to the claims of their patent and that regardless of any prior inventorship that the present Applicants establish, this would not effect the validity of the Eckloff et al patent.

To sum up this point, the language that appears in paragraph (a)(1) of Rule 131, beginning on line 6 and following, reads as follows: "...which substantially shows or describes but does not claim the same patentable invention as defined in §1.601(n), ...." fits this situation exactly. In fact, this same language probably fits every other Rule 131 Affidavit that is filed, for the simple reason that if a person's invention is unobvious over the earlier patent which you wish to swear behind, what is the need for swearing behind it with the Rule 131 Affidavit in the first place?

The following text is to describe the subject matter of the Eckloff et al patent in detail and to recite and analyze the two parent claims in the Eckloff et al patent in sufficient detail to verify the point that it would be impossible for the Applicants in the present application to copy the claims in the Eckloff et al patent, and further that the claims in the Eckloff et al patent are in all likelihood patentable over and above the disclosure contained in the patent application now on appeal.

The Eckloff et al patent shows a manhole cover lifting apparatus where there is a beam 13 having a pivot member 14 at one end, and at the other end are two wheels. A lifting apparatus is located at a center portion



of the beam. The apparatus is positioned so that the beam extends across the manhole cover, with a pivot member 14 being on one side and the wheel 16 on the other side. The lifting apparatus is used to lift the manhole, and then is shown in Fig. 4 of the Eckloff et al patent the apparatus with the manhole cover is rotated away from the manhole.

Now, we turn our attention to the claims of the Eckloff et al patent. There are two parent claims (i.e., Claims 1 and 4) Each of these claims recite a combination in which there are components that are not present in any form in the text, drawings, and claims of the present patent application, so that it would be impossible for claims, such as Claims 1 and 4 of the Eckloff et al patent to be made in the present application.

More specifically, Claim 1 of the Eckloff et al patent has the two final paragraphs which read as follows:

""wherein said securing means comprises an elongated threaded member extending vertically through an opening in said elongated member at a location between said first and second means and mounted on said elongated member for rotation into threaded coupling with a threaded opening of the cover to secure the cover therewith, the portion of said threaded member above the elongated member comprising a device adapted to be engaged by a tool for rotating the threaded member in first and second angular directions, and wherein said opening in said elongated member comprises a slot for longitudinally adjusting the position of the threaded member on said elongated member, a bearing means having a dimension greater than said slot coupled to said threaded member for reducing the turning forces needed to rotate the

threaded member mounted on said elongated member and for distributing the weight of the cover to said elongated member when the cover is raised and supported by the threaded member.”

The components recited the two immediately above paragraphs in Claim 1 of Eckloff et al, are best shown in Fig. 6 in the Eckloff et al patent. The threaded member is shown at 52, and that comes into threaded engagement with a threaded opening 64 in the manhole cover 26. Actually, in the drawing of Fig. 6, the threaded member 52 extends into a coupling adapter 66 which in turn is attached to a threaded member 68 that extends into the openings 64. The device that is adapted to be engaged by a tool for rotating the threaded member is the hex nut 56 at the top of the threaded member. The opening that comprises a slot refers to the upper and lower slots 51 and 53 which is shown in side view of Fig. 6, and with the upper slot 51 being shown in the plan view of Figs. 8 and 9. These slots are recited in Claim 1 as being for longitudinally adjusting the position of the threaded member.

The bearing means that is recited in the second of the last two paragraphs of Claim 1 noted above, relates to the thrust bearing 60 which is shown in Fig. 6, this thrust bearing being recited as distributing the weight of the cover to the elongated member.

There is nothing in the disclosure of the present patent application which would support including limitations such as those in Claim 1 of Eckloff et al. In the present patent application under appeal, the connecting member is a lift attachment 62, and the preferred form of that is shown in Figs. 5-7, where there are two collet-like fingers 84 which have a circular cross-section, and these are extended outwardly to grip the lower edge of

the opening and the manhole cover 12. This securing device 62 is in turn connected to the interior lifting member 80 which is raised upwardly and downwardly by the rotation of the threaded member 68 (see Fig. 14 of the present application).

The other parent claim (i.e., Claim 4) of the Eckloff et al patent has a final two paragraphs which read as follows:

“an elongated member for supporting said securing means above the over and being supported by and coupled to said first and second means so that the cover and said first means are moveable through arcs about a vertical axis located outside the periphery of the manhole, means for maintaining the cover at the same angular position relative to the elongated member during the raising and horizontal moving of the cover and wherein said last mention means includes a pair of rod members spaced from each other and coupled to said elongated member and extending below the bottom of the elongated member, a spring bias means biasing said rod member against the elongated member to extend below the bottom of the elongated member so that when raised the cover top engages the bottom of said rod members against the spring bias to prevent rotation of the cover relative to the elongated member.”

In the latter part of the first two paragraphs noted immediately above from Claim 4 of the Eckloff et al patent, there is recited the means for maintaining the cover at the same angular position relative to the elongated member. This refers primarily to the component shown in Fig. 7, and the description of this appears in column 4 of the Eckloff et al patent, beginning

on line 23. There are two cover rotation preventors 72 mounted on the beam 13 in the slots 51 and 53. The rod members recited in the last part of Claim 4 of the Eckloff et al patent are the rod members 74 which extend downwardly through the slots 51 and 52 and engage the upper surface of the cover 26. The spring bias means for each rotation preventor 72 comprises the spring 80 which urges its related elongate member 74 downwardly toward the cover member 26.

The only item in the disclosure of the present application which is under appeal that could possibly be considered to correspond to the elongate member 74 in the Eckloff et al patent, is the abutment post 52 which is shown in Fig. 1 of the present patent application. However, this does not have any spring bias means to prevent rotation of the cover relative to the elongate member.

The point is that there is no way that the present patent application could support inserting two claims therein corresponding to Claims 1 and 4 of the issued Eckloff et al patent.

9. Why Claim 1 of the Present Invention Is Unobvious Over The Prior Art.

In this discussion, there will first be a recitation of Claim 1, along with a brief summary of the same, and then a discussion of each of the prior art references and why they do not meet the limitations of Claim 1.

a) Claim 1 reads as follows:

1. (Amended) A lifting assembly arranged to lift an object which has a width dimension and is at least partially surrounded by a base surface which has a substantial horizontal alignment component, such as a manhole

cover surrounded by a paved or ground surface, said assembly comprising:

- a) a base support assembly comprising:
  - i. a beam structure which has a lengthwise axis, is adapted to be positioned above the object, and has a length dimension greater than the width dimension of the object, said beam structure having a first pivot end and a second mobile end spaced from one another a sufficient distance so that the beam structure can be placed over the object to be lifted, with the first and second ends engaging the base surface in load bearing relationship on opposite sides of the object to be lifted, said beam structure being the primary load carrying structure relative to the object to be lifted;
  - ii. a pivot support connected to the beam structure and located at the pivot end thereof, and arranged to support the pivot end of the beam structure from the base surface and to engage the base surface in a manner to resist movement of the pivot support from a substantially stationary base surface pivot location on

- one side of the object to be lifted during movement of the lifting assembly;
- iii. a mobile support connected to the beam structure and located at the mobile end thereof, and arranged to support the mobile end of the beam structure from the base surface on an opposite side of the object to be lifted, said mobile support having a mobile base surface engaging portion to enable the mobile support to be moved laterally over the base surface;
  - b) a lifting mechanism mounted to the beam structure between the pivot support and the mobile support and comprising a lift connection to engage said object and an actuator acting through said lift connection to lift said object

whereby said lifting assembly can be positioned over said object with the pivot support being on one side of said object and the mobile support being on an opposite side of said object, so that said lifting mechanism is able to raise said object, and the mobile support of said lifting assembly can be moved laterally so as to move said object about said pivot support.

Let us now consider the prior art patents.

b) U.K. patent application 2,045,206A.

This patent was only recently cited in the prosecution of the present application (i.e., in the Office Action mailed December 14, 2001). This shows a manhole lifting device which is supported by two rear wheels 50 and 51 which are non-steerable, and a forward single wheel 65 which can be steered by means of a handle 66. The rear wheels 50 and 51 are supported from a transverse beam 47 which connects to a forwardly extending center beam structure comprising in part the member 40. The front steerable wheel 65 is rotatably mounted about a vertical axis at 62 at the front end of the member 40. The wheel arrangement is substantially the same as a prior art tricycle commonly used by a child.

There is a lifting assembly mounted to the forwardly extending beam 40/41. The operation of this apparatus is described on page 2, first column, in the paragraph beginning on line 33 and ending on line 46. This is as follows:

"When the device is in use, with the bars 21, 22 secured to a manhole or inspection cover, as shown in Figure 3, the manhole or inspection cover can be raised perpendicularly out of its supporting structure 11 by simultaneous actuation of the two jacks 56, 57. Once raised to a position to above the level of the edge of the support structure 11, an operator

can move the whole device with the manhole or inspection cover attached to it away from the hole. The handle 66 is used for this and also provides steering for the wheel 65. The width between the wheels 50, 51 is sufficient to clear the edges of the hole. The device may be moved forward or back and can be easily moved to any desired position."

As indicated above, this has the wheel mountings of a child's tricycle where the two rear non-steerable wheels are spaced laterally from one another and rotate about a common transverse axis of rotation, while there is a forward wheel which is steerable. To replace the vault cover, presumably the apparatus would have to be steered in a backwards direction with the two rear wheels 50, 51 straddling the vault opening.

The most obvious difference in this British patent from the present invention is that there is no pivot support that engages the base surface in a manner to resist movement of the pivot support from a substantially stationary base surface pivot location. All three supports of the British patent application are wheels and this is the way it is intended to be in the British patent. As indicated above, in column 2, in lines 33-47, the very last sentence reads as follows:

"The device may be moved forward or back and can be easily moved to any desired position."

To take one of these wheels and make it a stationary location would totally frustrate the purpose of this British patent.



In the last Office Action, the Examiner rejected Claim 1 (and also other claims) as being anticipated by the UK patent application 2,045,206 with the following statement:

"Note the mechanism can be steered by wheel 65. When the mechanism is pulled right or left by wheel 16 the rear wheel serves as a pivot. This motion is like that of a standard floor jack."

With all due respect to the Examiner's position, it is stated in Claim 1 that the pivot support is arranged to engage the base surface in a manner to resist movement of the pivot support from a substantially stationary base pivot location. It is clear from the language of the specification of the present application that this "pivot support" cannot be interpreted to refer to a wheel. In the present invention, a key feature is that the pivot support remains stationary so that the manhole cover comes back into the same aligned position with the manhole opening.

If this Claim 1 were interpreted to mean that one of the wheels of this British patent had enough frictional resistance to be a pivot support member within the meaning of this patent application, that would be absolutely contrary to the teaching of the British patent, since it is intended that support member can be wheeled away in most any direction. The last thing one would want is a bad wheel that wanted to stick in place and act as a pivot.

To carry this analysis a step further, let us assume for the sake of argument that the steerable wheel 65 were to be made as a stationary pivot support. If that were the case, then the two rear wheels 51 would be oriented in the wrong direction, and would not be able to move laterally about that pivot.

Let us assume that we made one of the other wheels 50 or 51 to be a stationary pivot support member. First, there is absolutely no reason to do so within the meaning of this British patent, but even if we did, then what reason would there be to have the handle 66 and the steerable wheel 64? With one of wheels 50 and 51 as a stationary pivot location, the front steerable wheel 65 would only be able to move in one direction anyway, namely the path dictated by the pivot location of the wheel 50 and 51.

In summary, not only would it be unobvious to modify this British application to meet the limitations of Claim 1, but would be totally antagonistic of the teachings of this patent.

b) U.S. 5,035,336 (Schmitz, et al.).

This patent shows a "manhole cover lifter" where there is a rectangularly shaped frame 12 having four wheels arranged in a rectangular configuration at the four corners of the frame. The arrangement and operation of these is described in column 3, beginning on lines 29-37 as follows:

"In accordance with the preferred construction, the manhole cover lifter 10 is supported on wheels 58. The wheels 58 are preferably non-castering or swiveling wheels, so that the frame 12 can be guided along a straight line toward and away from the manhole 14 in accordance with the slope on the street surface 60 for maximum control. A lock 62 is preferably provided on each of the wheels 58. If desired, a handle 64 connected to frame 12 at pivots 66, can also be provided."

Substantially the same arguments that were made with respect to the British patent U.S. 2,045,206A, can be made to the Schmitz patent. As indicated previously, the only meaningful discussion of the wheels is located in column 3, lines 29-37, of this patent. The preferred configuration is that the wheels be non-castering so that these can be guided along a straight line. It also indicates that a lock 62 is preferably provided on the wheels 58, and that a handle 64 could be connected onto the frame.

It is obvious that this is intended to be a rolling cart that is freely moveable. There is no teaching or suggestion that this should have a fixed pivot location as in Claim 1. If it were, then the apparatus of the Schmitz could not be moved in a straight line, and then is entirely antagonistic to its teachings.

c) U.K. Patent Application GB 2,111,017A.

This patent discloses a manhole lifting cover device which has a frame with a T-shaped configuration, with one jacking device 21 located at the end of the center member of the "T" and positioned on one side of the manhole, and the other two jacking devices 22 and 23 being located at opposite ends of the cross member of the "T" on the other side of the manhole cover. Each of these jacks 21, 22, and 23 are placed at stationary locations. There are two threaded connecting devices 17 and 18 which are adjustably located on the central member of the T-shaped frame, and these extend downwardly to connect to the manhole cover. Then the jacks are operated to lift the T-shaped frame and also the manhole.

This patent is even further away than the two patents discussed above in meeting the limitations of Claim 1. First, there is no stationary pivot location because there simply is no pivoting that occurs. Second, there is no mobile support connected to the beam structure. It is all stationary.

Accordingly, this British patent application could not by itself be considered as rendering the present invention obvious.

However, in the earlier Office Action, the British patent is combined with the Schaller patent (U.S. 4, 662,526) and that brings us to the next section immediately below to discuss the

Schaller patent and see if it would be proper to combine it in some manner with U.K. patent GB 2,111,017A.

d) U.S. 4,662,526 (Schaller).

This patent is directed toward the problem encountered in removing the cover of an electric arc furnace, and it was combined with the British reference 2,111,017A to reject Claims 1-9 and 13. In reading the section under "Description of the Prior Art", the patent points out that the gantry arm that extends over the furnace is exposed to a temperature of approximately 400 degrees C which can cause deformation and damage to the hoist mechanism, particularly in the joints. The entire thrust of this patent is to alleviate this problem. In the first sentence under "Summary of the Invention" (column 1, beginning on line 46), the text reads as follows:

"The object of the present invention is, therefore, the provision of a hoist mechanism for a cover for an electric arc furnace which is relatively immune to heat and the effects of electric current."

If one reads through the rest of column 1 and to the top column 2 of this Schaller patent, it will be seen that there is a system described where cooling fluid surrounds the pulling or hoisting rods and the hoisting piston cylinder mechanisms. The gantry arms of the invention and transverse bars are provided with fluid-type connectors for a cooling fluid. Then in column 2, line 7, we find the following sentence:

“The protective pipes will thus operate at a temperature of the coolant and can be kept below a temperature of approximately 50 degrees C without any difficulty. The fact that this temperature may be kept down to this degree is particularly important for the hydraulic hoisting mechanism.”

It happens that in this particular design of Schaller, the entire mechanism has a base 4 with a pivot location 20 and two wheels 21. The only mention that is given to this particular arrangement is a ten-word sentence that appears in column 2, beginning in line 66 as follows:

“The gantry 14 is arranged about support pin 20 on wheels 21”

Thus, it can be seen in Fig. 1 that there is a pin 20 which fits in an opening in the furnace platform 3, mounted to one end of the gantry 4, and there are two wheels 21 at the opposite end of the gantry 4 which are aligned so as to move in an arcuate path about the pivot location 20.

In the most recent Office Action, the position taken by the Examiner is as follows:

"The Schaller reference is deemed to be an applicant's field of endeavor in that it deals with moving a cover. If one adopts applicant's position that it is not in applicant's field of endeavor, the reference would have still

commanded itself (possibly this should have been "commended") to an inventor's attention in considering moving a manhole cover from a hole. Basically, to provide a pivot and wheel to move the cover from the hole."

Again, with all due respect to the Examiner's position, it is difficult to imagine two areas of endeavor which are more widely separate (i.e., the task of moving and replacing manhole covers in the task of providing for an electric furnace a hoisting mechanism that is able to withstand extreme high temperature environment). The problems encountered are far removed from one another. The main problem at hand by the present invention is providing a user-friendly means of lifting a manhole cover to alleviate back problems of human beings. The main endeavor of the Schaller patent is to provide a hoist that can withstand the high temperature environments. A person would not even be close to this furnace, considering it is necessary to withstand heat of 400C. If one were looking at ways to improve manhole cover lifting devices, would one have any reason to look for a hoist that is particularly designed to withstand high temperature environments?

Further, we cannot equate all lids or covers, no matter what the application, to be all one analogous art where someone would search far and wide. Most every industry or activity in any human activity or endeavor has some sort of a cover. There

are hatch covers for boats, access covers for airplanes, covers for cookie jars and cooking utensils in the kitchen, covers to cap an oil well, gas cap covers for automobiles, etc. If we were to show a person U.K. patent GB 2,111,017A, and ask that person to find some improvement based solely on the disclosure of this patent. Is there any realistic possibility that this person would search out some cover in an electric arc surface in a factory to come up with this particular support device that is shown in the Schaller patent, and substitute this for the supports in the British reference?

Accordingly, it is submitted that this is an improper combination and that these two references could not be combined to reject Claim 1.

10) The Patentability of the Depending Claims 3-9, and 13.

i) Claim 3.

This has the additional limitation that the surface-engaging portion moves in an arcuate path so that this feature is stated more explicitly.

ii) Claim 4.

This has the further limitation of having a pair of surface-engaging wheels on opposite sides of the mobile end of the beam structure. This adds stability to the assembly and further simplifies the tasks of the workman.



iii) Claim 5.

This claim depend upon claim 4 and indicates that the two wheels have an axis of rotation where the two axes converge to meet at the location of the pivot support. This distinguishes over the use of casters which rotate in most any direction, and this arrangement of the wheels again adds more stability to the arcuate path traveled so that the removal and replacement can be handled more expeditiously.

iv) Claim 6.

This relates to the post extending downwardly from the pivot end to engage the base surface. This makes this feature more explicit.

v) Claim 7.

This depends upon claim 1 and adds that the lifting mechanism is a lifting jack mounted to the beam structure at an intermediate location of the beam structure. This provides a simple arrangement and also makes the apparatus “user-friendly”.

vi) Claim 8.

This depends upon claim 7 and adds a further limitation that the jack has a substantially vertical lift axis. This enhances the ability to properly raise the manhole cover and also lower it into a precise location.

vii) Claim 9.

This depends upon claim 8 and recites specifically the screw jack. It should be kept in mind that the apparatus should be “user-friendly” and also place little stress on the person who is utilizing the assembly of the present invention. As indicated in the prior remarks in this appeal brief, with a rotary force of 4 to 11 pounds, the lifting force of 900 pounds could be accomplished.

viii) Claim 13.

This makes it more explicit that the object being lifted is a manhole cover and that the base surface is a paved ground surface adjacent to the manhole cover.

11. Skill Level Of Those In The Arts.

We now look at the issue of whether the differences between the present invention and the prior art are unobvious to “one of ordinary skill in the art to which the invention pertains”. This issue warrants some careful analysis. As indicated earlier in this text, the problem toward which the present invention is directed is that workmen in the utility industries having back injuries from removing and replacing manhole covers (vault lids) has been with us for at least 90 years. The problem is still there. Why? In every work environment where there is susceptibility to injury, there are safety manuals, safety programs, evaluations by OSHA representatives providing a safe work environment, etc.

To speculate further on this issue, in a more controlled environment, such as being in a factory where there are the same walkways, the same

machines, etc., then it is a simpler matter to carefully examine the workplace and identify various items that could be dangerous. The day-to-day working environment can more easily be observed by supervisory personnel or safety personnel to ensure the proper safety measures are utilized.

However, in an industry where people travel from place to place and have a schedule they must keep, they are pretty much on their own and we have a somewhat different situation. There can be group instructions given on how to lift, guidelines published, and this is of course being done in the various utility industries. Yet the back problems have persisted for many decades.

To put the present invention together, one should have insights into at least the following factors:

- i) an understanding of the capabilities and limitations of the human body (not just a superficial understanding, and not just an abstract academic understanding, but who can also relate this to a practical working environment).
- ii) an understanding of the actual day-to-day operations of the people who work with utility vaults and vault covers, and what can reasonably be accepted by these people.
- iii) the design skills to match these requirements and come up with an apparatus and method that satisfies the diverse requirements.

In coming up with the present invention, the inventors concluded that there is nothing available in the prior art to meet all these requirements.

Therefore, they had to perform sufficient analysis, study, and experimentation to find the following:

- i) create an apparatus which involves physical movements by the workmen which are of such a nature that these would minimize the risk of back injuries;
- ii) build an apparatus where these physical movements could be performed and yet accomplish the lifting action with sufficient force, and also the application of lateral forces to get the basic job done (i.e. lifting the manhole cover, moving it laterally, and then moving it back to its original position) without creating undesired strain on the person's back;
- iii) making sure that the operation of the machine is sufficiently user-friendly and effective so that the workmen would want to use it;
- iv) meet the other requirements of being practical in the working environment in which these people operate; and
- v) make it cost-effective (being able to get the job done effectively within a sufficiently short time period).

Mr. Davis, one of the co-inventors, had sufficient insight into many of these requirements so that he recognized that possibly there is a basic problem that in the present environment, in that no matter how many safety courses you give, this has not (and likely will not) make a significant reduction in the occurrence of back injuries. This led him to study the basic movements that would be possible and how these might be employed in developing an apparatus which simply did not presently exist in the prior

art. Mr. Neeley, the other co-inventor, cooperated with Mr. Davis to work on designs that would meet these criteria and would have sufficient simplicity, and yet “do the job”. Then there has to be cranked into this equation the intangibles of what will be acceptable to the workmen who are on a schedule to get their job done within an allotted time. Over the many decades, the other attempts at mechanizing this task have apparently not been accepted to any great extent. It was necessary to look at the human obstacles and solve these also.

Then, after the basic design was conceived by Mr. Neeley and Mr. Davis, it must be tried out, streamlined, and optimized to develop an overall acceptable solution.

With all that being presented, how does this relate to identifying that “imaginary” person whom we must create intellectually as “one of ordinary skill in this art”?

In reviewing the patent literature relating to the removal and replacement of manhole covers, it is submitted that one would have to conclude that the skills required to solve this problem are “fragmented”. To put this another way, there are several different parts of the puzzle, and different people looked at different parts. For example, there are a number of manhole-lifting devices that appear in the prior art (these being listed in the prior art statement) and to the best of the applicants’ knowledge, none of these have obtained wide commercial acceptance. While these might have quality design features in terms of mechanical movements, in the overall picture they are lacking.

Therefore, we would have to conclude while there may be intelligent people who have looked at this problem and attempted a solution, in terms

of results, the skills of these people are fragmented, some people looking at one part of the puzzle and some at another, etc.

Thus, what is the “bottom line”? This process of removing and replacing manhole covers is a rather isolated area of study, and very little has been developed in the way of a combination of skills to come up with a practical solution.

#### 14. Summary


To summarize some of the main points, the following is submitted:

- a) The problem solved by the present invention has been with us for at least 90 years, and it is a serious problem. The present invention is able to meet the criteria to solve this problem.
- b) A skill level for people who are in this art (i.e. devising a practical, user-friendly mechanism for removing and replacing manhole covers) has never developed to any appreciable degree. It is not because the people who have made attempts in this are not intelligent. Rather, to come to a successful design, there are various pieces of the puzzle which must be put together, and it's even questionable whether such people now exist (except possibly for the co-inventors who have begun with some basic skills and have filled the gaps in going up their learning curve in creating the present invention).
- c) The benefits derived by the present invention are substantial, it is not evident that these could be achieved by the prior art. In the present invention, the lifting of the

manhole cover is accomplished mechanically and the lateral movement is simple pulling movement and places hardly strain on the person's back. The apparatus with the manhole cover follows a predictable arcuate path. The return of the manhole cover back to its original position can be accomplished reliably and is just as simple as the removal of the manhole cover, with the manhole cover travelling the same arcuate path to be automatically aligned with the manhole. The apparatus itself is arranged so that it may be made small, easy to handle, and thus convenient to the workmen. And, most important, the stress on the person's back is substantially non-existent.

Signed at Bellingham, County of Whatcom, State of Washington this  
13th day of January, 2003.

Respectfully submitted,  
ALVIN L. NEELEY, ET AL.,

By   
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	NEELEY ET AL	)	
		)	Attorneys' Ref.: P112554
Serial No.:	SN 09/440,149	)	
		)	Examiner: Underwood, D.
Filing Date:	11/15/99	)	
		)	Group: 3652
Title:	MANHOLE COVER LIFTING APPARATUS AND METHOD	)	

**DECLARATION OF STEVEN M. DAVIS**

I, STEVEN M. DAVIS, having a home address of 125 So. 309th St. Federal Way, WA 98023, state and aver the following:

1. I am the Steven M. Davis who is one of the co-inventors of the above noted patent application.
2. I received my Bachelor of Science Degree from Seattle Pacific University in 1989, majoring in Exercise Physiology and Biomechanics (Exercise Science). After graduation, I worked a short time in the field of physical therapy and was an orthopedic medical assistant at Providence Downtown Medical Center in Seattle, Washington. I then attended Auburn University, obtaining my Masters Degree in 1992 in Exercise Physiology including Biomechanics, with an emphasis in Industrial Engineering and Ergonomics. Since that time, I have worked as an Ergonomist and occupational safety and health consultant, and for the past five years one of my major clients has been Seattle City Light, which employs a number of utility work crews who commonly remove and replace manhole covers (vault lid covers) on a day to day basis.
3. I have been asked by Mr. Robert B. Hughes, the patent attorney who had



prepared and is prosecuting the above application, to provide certain information concerning the prior art methods of removing and replacing vault covers (often called "manhole covers"), and the effect of this is placing stress on the back of the workman involved in employing such processes. Mr. Hughes has further asked me to perform a similar analysis of the operation of the apparatus as described and claimed in the present invention, and how this relates to the physical stress that might be placed on

the workman and how this relates to back injuries.

4. On the basis of (a) my formal education (particularly my graduate studies in industrial engineering, physiology and ergonomics), and also on the basis of (b) my experience as a consultant in these areas, and (c) the studies and further research I have done in these areas, I believe I can make the following statements with reasonable assurance that these are correct and accurate.
5. My analysis of the various prior art practices of manually removing vault lids clearly indicates that this exposes the workman to substantial risk of back injuries. Further, the statistical analysis which I have done in this area clearly confirms this. The awkward lifting positions required, when manually lifting vault covers, coupled with the high lifting forces required clearly exceeds the maximal permissible limit (MPL) for safe lifting associated with excessive compressive forces on the L5/S1 disc in the Lumbar Spine.

Additionally, the forces placed on other joints in the body such as the knees and shoulders often exceed the MPL or Recommended Load Lifted for safe lifting.

These excessive joint and spine forces significantly increase the risk for musculoskeletal injuries when vault covers are manually lifted. Risks are also significantly increased depending on environmental and road conditions as well as the impacted condition of an already heavy vault cover ranging in weight from 150-

600 pounds. Lifting forces can exceed 1,000 pounds when lifted from the center of mass of the lid.

6. The manual removal of vault lids is either a one or two person operation, depending on the size of the vault lid and/or its impacted or condition on the roadway.

- i. Vault lids typically weigh 150-600 pounds each and range from 24 inches to 44 inches in diameter. The force required to remove a vault lid is significantly increased when it is impacted by traffic and the accumulation of foreign debris such as asphalt, dirt, etc. The average lifting force required for the majority of severely impacted 44 inch vault lids has been determined to be in excess of 1000 pounds and can be as high as 2000-3000 pounds when lifted from the center of mass, depending such factors of frequency of removal, maintenance of the roadway, volume of traffic, etc.
- ii. To remove a vault lid, one common method is to use a C-shaped hook welded to a T-bar lifting device that is placed in a designated hole drilled in the surface of the vault lid. The operator's feet are positioned properly for stability. The lid is removed by lifting up and backwards until the front edge has been dislodged from the frame. Then the vault lid is pulled from the vault access and dragged approximately three feet to six feet until safely clear of the vault access. When all underground vault work has been completed, the vault lid is dragged from its resting position and securely placed onto the vault access. Depending on the weight/size of the lid, dragging the lid on the roadway often takes 60-100 pounds of forceful pulling while stepping backwards.
- iii. The total time required for set up and manual removal and repositioning of the vault lid is approximately three to five minutes unless a vault lid is severely impacted into the roadway as described above. Generally, if impacted, a sledgehammer is used to pound the outside edge of the vault lid and break the securance seal or a truck with a bomb hoist must be called to mechanically remove the impacted vault lid. Whether the vault

lid is actually lifted and removed or attempted to be manually removed and found to be stuck, the risk of injury is significant each time.

- iv. Due to the substantial physical challenges of manually lifting and handling vault lids using those methods, various automated or semi-automated mechanical lifting devices devised, such as truck lift using the power of the truck and a Lanyard, a Quinn Roller Block which is a leverage device, or any other leverage bar device having been designed and integrated in utility work. However, these have not been widely accepted due to awkwardness and/or inability to be consistently used in all situations, and vault lid removal is still predominantly manually performed.
7. In general, on a statistical basis, a large percentage of occupational injuries resulting from physically demanding work are strain/sprain type back injuries. These commonly occur when a person is performing a lifting motion, and particularly when the lifting movement involves not just a straightforward lifting motion with a relatively safe load, but where the lifting motion is accompanied by the person being in an unbalanced position, and/or conducting the lifting motion where there are lateral or twisting forces coupled with high lifting and pulling forces. I have analyzed the biomechanics of lifting when workmen manually remove and replace vault covers, and I find the following:
- i. the lifting of vault lids can require an awkward unbalanced stance;
  - ii. excessive forward bending (awkward lifting postures) coupled with extreme lifting requirements increases spinal disc pressures particularly at L4-L5. These lifting demands require high force output from the back musculature including the erector spinae muscles, which are more endurance muscles than power muscles. These demands often far exceed maximal permissible load limits and recommended load limits for the back;
  - iii. frequent unstable footing when lifting, pulling and dragging vault lids.

Continually performing this type of physically demanding work significantly

increases the likelihood of a serious cumulative work related musculoskeletal disorder (WMSD) affecting the back and/or other musculoskeletal joints including the knees, shoulders, etc. In general, even if the best and safest lifting postures and techniques are assumed when lifting vault lids, the physical requirements and absolute demands significantly increases the risk for severe injuries.

8. I have performed a similar analysis relating to the physical motion of the workmen in utilizing the present application. When using the vault lid lifting tool, which is shown and claimed in the present invention, the risk for cumulative types of musculoskeletal injuries is virtually eliminated. There is no awkward lifting, dragging the vault lid or excessive force requirements. The tool is easily and efficiently operated so that when the person is exerting any force, he is standing in a fully upright position. The lid is easily lifted using a hand crank or screw gun coupled with a lifting jack affixed to a horizontal frame over the lid. The lid is lifted quickly using 4-11 pounds of hand arm force for up to a 900 pound lift. A ratchet device can be used along with the tool if lifting force exceeds 900 pounds. Because the person can operate the tool in an upright position and hand/arm force requirements are minimal, footing is always stable.

Once the lid is lifted using this tool, the lid is rolled out of the way (one hundred and eighty degrees) to access the underground vault. This can also be accomplished with the person being in an upright position. When done, the tool is rolled one hundred eighty degrees back to its original spot and the lid is replaced directly into the vault access hole. No lifting or dragging is required in either case.

9. I, Steven M. Davis, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code,

and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

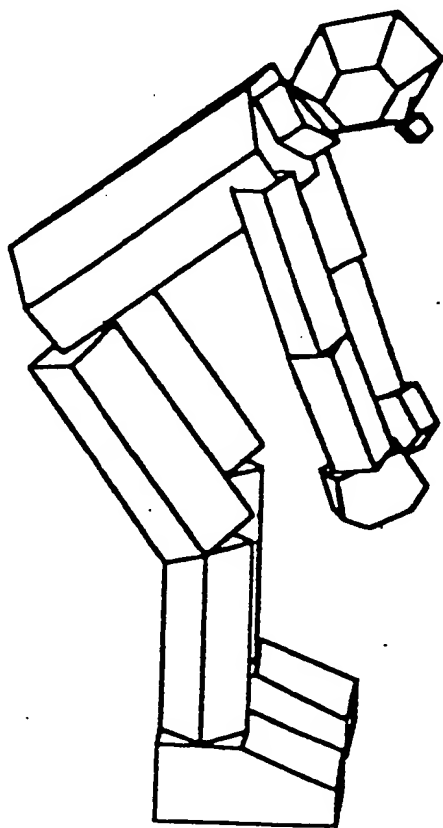
EXECUTED this 15 day of May, 2000.

A handwritten signature in black ink, appearing to read 'S.M. Davis', is written over a horizontal line.

STEVEN M. DAVIS

Analyst: IOE

Task: New Task



3DSSPP™

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## Anthropometry

Gender: Height &amp; Weight:

- ☐ 5th %ile  
☐ 50th %ile  
☒ Male  
☐ 95th %ile  
☐ Female  
☐ Specific

Height (Inches) 74

Weight (pounds) 217

## Hand Location

Hand Location (Inches):

	Left	Right
Horizontal	12	12
Lateral	-6	6
Vertical	24	24

- ☐ Supine (Palms Up)  
☐ Semi-Prone  
☒ Prone (Palms Down)

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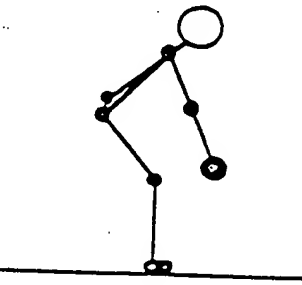
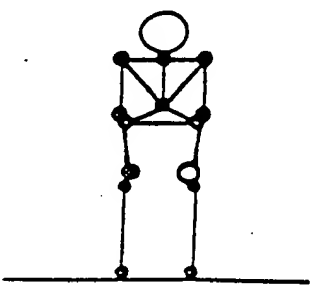
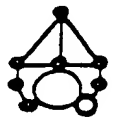
JAN 21 2003

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## Forces At Hands

Action:	Direction (Deg.):		Magnitude (Pounds):
	Horiz.	Vert.	
<input type="radio"/> Lift Up			
<input type="radio"/> Press Down			
<input type="radio"/> Pull In			
<input type="radio"/> Push Away			
<input checked="" type="radio"/> Specific			
	Right: 90	-60	Right: 120
	Left: 90	-60	Left: 120



	
<p>3DSSPP™ © The University of Michigan</p> <hr/> <p>Analyst: IOE Task Name: New Task Action: Specific</p> <p>Gender: Male Height: 74 inches Weight: 217 pounds</p>	

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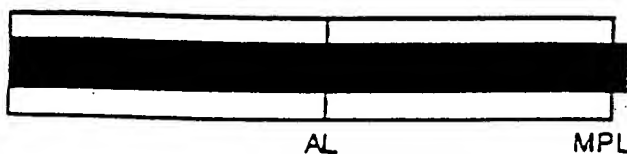
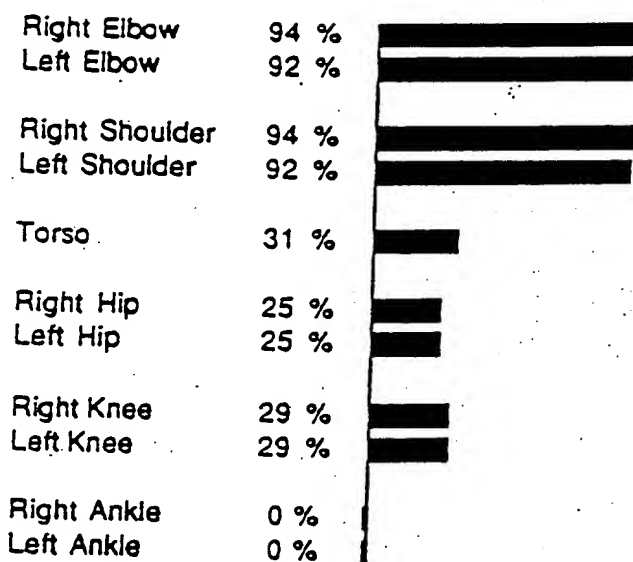


**Analysis Summary**

Analyst: IOE Task: New Task

Predicted Compression Force at L5/S1:

1480 ± 118 Pounds

**Predicted Percent Capable:**

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JAN 21 2003  
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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	ALVIN L. NEELEY ET AL.	)	
		)	Attorneys' Ref.: P112554
Serial No.:	09/440,149	)	
		)	Examiner: Underwood, D.
Filing Date:	11/15/99	)	
		)	Group: 3652
Title:	MANHOLE COVER LIFTING APPARATUS AND METHOD	)	

## DECLARATION OF ED MECUM

I, ED MECUM, having a home address of 9020 22<sup>nd</sup> Avenue SW, Seattle, Washington, 98106, state and aver the following:

1. I began working at Seattle City Light in 1972, and my first job was as a helper on a line crew. This work involved the installation and maintenance of overhead electrical power lines. In 1981 my assignment at Seattle City Light was changed to be a helper on a network crew (which are also called a distribution system underground network crew). This involved the installation and maintaining of the underground high voltage distribution system. In about 1989, I was made a crew chief (foreman) at Seattle City Light of a network crew, but doing work that was quite similar to my assignment in 1981 as a helper.

2. In Seattle City Light there are commonly three men on such a crew. In a normal day's work, the three people in the crew would ride in a van to one or more job sites where there is a vault, with most of these being an underground vault with a vault cover or lid. Our van would be a little bit smaller than a UPS truck and would be loaded so that the total load with various equipment, such as splicing equipment, ladders, safety equipment, etc., generally takes up most all of the room in the truck. At the job site the helper would normally set up the metal barriers and fences around the manhole cover (vault lid). The manhole cover would be removed from its position covering the vault

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GROUP 3600

opening, and then one or more of the workmen would go downwardly through the vault into the vault area to perform the work.

3. Quite often, the manhole covers are located on a roadway (generally Paved roadway) and a typical manhole cover could be about 42" in diameter and weigh 400 pounds or possibly somewhat less for a smaller vault lid. One typical way of lifting a manhole cover from its closing position is to connect a city hook to the sides of the manhole cover. This city hook has an end hooking member and a rod or bar about  $\frac{3}{4}$ " in diameter and about 2  $\frac{1}{2}$  feet long. At the top of the bar there is a cross handle (so that the bar and the handle has an overall T-shape). One man would be on one side of the manhole cover and one on the other, and both would lift on the T-bar to lift the cover out of the vault opening. The two men raise the manhole cover about two inches above the surrounding street surface and then move the manhole cover sideways to let it rest on the surface.
4. In some instances, the manhole cover is "stuck" in the opening. This could happen, for example, when the street has been paved or re-paved and the paving material has worked in around the edges of the manhole cover. When this happens, it is common for the worker to use a sledgehammer and beat on the manhole cover until it is loose. Then the same lifting operation is employed.
5. This general system of lifting the manhole covers has been used by Seattle City Light ever since I began working there, and to the best of my knowledge this is generally the same system that is used throughout the industry. I was asked by Mr. Hughes, the patent attorney whom I understand is handling the above-noted patent application, as to how long these vaults with the vault lids for electrical power distribution systems have been in existence and how long it has been used. Again, to the best of my knowledge, these have been in existence when underground electrical distribution networks have been used, and these have been in existence for about the last 90 years.

6. I've also been asked by Mr. Hughes what other systems have been tried or used. Other methods have been tried, such as attaching a fulcrum or other member to a lid to the manhole cover and providing some sort of handle for lifting it. However, to the best of my knowledge, a manual operation where the worker lifts the manhole cover above the hole by pulling upwardly on a handle or other device remains the commonly used method of removing manhole covers. With a 400-pound lid, the two workmen would each be exerting an upward pull of about 200 pounds (somewhat more if the lid is stuck in some manner).

7. I have also been asked by Mr. Hughes whether I am familiar with a vault lid cover which is the subject matter of a U.S. patent application which I understand has been filed by Mr. Neeley and Mr. Davis. I have examined a drawing entitled Fig. 1 showing a vault lid cover with a lifting tool positioned over the vault lid cover. More specifically, the tool is made up of a beam which has one end support indicated at 28 about which the beam pivots. At the opposite end of the beam there is a pair of wheels 40 by which the beam can be rotated about the pivot location at 28. There is also a screw actuated lifting member which has a handle 66 and a connecting end at 62 to connect to the lid. I am fully familiar with this tool, and I have seen it in operation, and have used it many times.

8. More specifically, Mr. Hughes has asked me to comment on a memorandum dated August 30, 1994 which I had sent to Steve Davis. A copy of that letter is attached to this Declaration. As you can see from the contents of that letter, the tool that is shown in the attached Fig. 1 was used in Seattle at the location of Third and University on the 29<sup>th</sup> of August 1994. We used the tool on three different types of covers. As can be seen from the comments in my letter, this tool removed one cover that was wedged into the roadway so tightly that it would have bent the truck when the usual method of truck power and a lanyard and hook would be used. Care must be taken with this method as the lanyard or hook can fail under load.

9. I have also been asked by Mr. Hughes to comment on the statement which I had made that mounting this tool in a handy location would encourage its constant use and

make it more user friendly as the crew becomes accustomed to it. To explain this further, if there are inconveniences or time delays in trying to get a piece of equipment set up, or if it is awkward to handle, the person on the crew is likely not going to take the trouble to use it but simply go back to the tried and true way of using the hook, even though it does put strain on the person's back. Also, the equipment has to be easily accessible. This is why I suggested in my letter that the main part of the tool could be mounted to the front exterior of the truck and the miscellaneous pieces be placed in a small box attached to the inside of the rear door. This tool can be set up very quickly, and it is very simple to use. Further, there is the convenience that after the tool is used to move the vault lid off to the side, then the replacement becomes very easy since its just the reverse operation of moving the tool about a pivot point back over the vault lid opening.

10. Mr. Hughes has also asked me to comment in my statement that this could drastically reduce the risk of back injuries. While I can't give hard statistics on this, on the basis of my experience in my jobs for Seattle City Light, at least half of people on the crew (probably a lot more) have some sort of back problems. The lifting and removal of vault lids is one of the jobs that probably places as much strain on the person's back as any other job that we do. Quite often a person on the crew (particularly a younger person) will take the lifting of the vault cover as a physical challenge and do the lifting in the usual way. However, after a person has sustained a back injury, if he can be provided with a tool that would reduce the odds of re-injuring the back, this tool would be a real help.

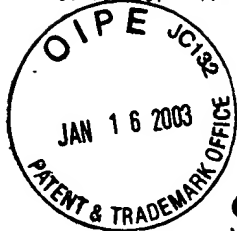
11. Mr. Hughes has also asked me to comment on the need for a tool such as this and whether it would be what he calls "obvious". My answer to that is that I've been doing this kind of work since 1972, and over the years I've fully realized that the lifting of vault lids is a common cause of back injury. Nothing has come along which seems to provide an answer that is practical, meaning it is one that would be sufficiently user friendly to be acceptable in the day to day work routine. This tool seems to answer the problem with what appears to me to be a practical solution.

12. I, Ed Mecum, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

EXECUTED this 15 day of May, 2000.

Ed Mecum

ED MECUM



Seattle  
City Light

## Memorandum



AUG 31 1994

DATE: August 30, 1994  
TO: Steve Davis  
FROM: Ed Mecum, Network Crew Chief  
SUBJECT: Manhole/Cover Removal Tool

Thank you for bringing out your new tool to Third and University on the 29th of August for testing and evaluation. I feel that this new light weight tool will be an efficient and economical tool for removing manhole covers. Monday's test put the tool to use on three different type of covers. Your removal tool easily lifted a cover that is normally wedged into the roadway so tightly, it bends the hook when removed by our usual method of truck power and a lanyard and hook.

I believe the use of this tool could drastically reduce the chance of back injuries in the Network. To accomplish this, I recommend the following:

That the main part of the tool be mounted on the rear exterior of the truck. That the miscellaneous pieces be placed in a small box attached to the inside of the rear door. This arrangement places the tool in an easily available location and would encourage the crew to use it, as most splicing work is done off the back of the truck. Mounting this tool in a handy location would encourage its constant use and make it more user friendly as the crew becomes accustomed to it. I feel one of the distinct advantages of the tool is that the lid once removed is in the grip of the fixture and is easily rolled back in place, often times underground crews believe a heavy lid will return to place easily when dragged back by hooks. This leaves personnel vulnerable to back injuries. I would be interested in having one of the tools mounted on truck 4287 for further testing and evaluation.

EM:jp  
J45\MANHOLEREM

*Ed Mecum*



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	ALVIN L. NEELEY ET AL.	)	
		)	Attorneys' Ref.: P112554
Serial No.:	SN 09/440,149	)	
		)	Examiner: Underwood, D.
Filing Date:	11/15/99	)	
		)	Group: 3652
Title:	MANHOLE COVER LIFTING APPARATUS AND METHOD	)	

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JAN 21 2003

**GROUP 3600**

DECLARATION OF STEVEN M. DAVIS

I, STEVEN M. DAVIS, having a home address of 125 So. 309th St. Federal Way, WA 98023, state and aver the following:

1. I am the Steven M. Davis who is one of the co-inventors of the above noted patent application.
2. I received my Bachelor of Science Degree from Seattle Pacific University in 1989, majoring in Exercise Physiology and Biomechanics (Exercise Science). After graduation, I worked a short time in the field of physical therapy and was an orthopedic medical assistant at Providence Downtown Medical Center in Seattle, Washington. I then attended Auburn University, obtaining my Masters Degree in 1992 in Exercise Physiology including Biomechanics, with an emphasis in Industrial Engineering and Ergonomics. Since that time, I have worked as an Ergonomist occupational safety and health consultant, and for the past five years one of my major clients has been Seattle City Light, which employs a number of utility work crews who commonly remove and replace manhole covers on a day to day basis.
3. In performing my consulting services for Seattle City Light, I soon became aware of the problem of back and other musculoskeletal injuries which resulted from employees of various utility companies removing and replacing vault lids (commonly



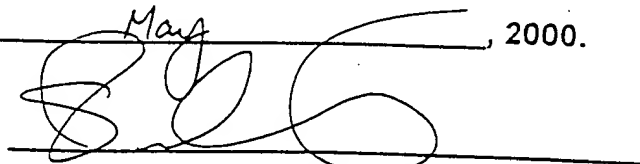
called "manhole covers"). The manual removal of vault lids is either a one or two person operation depending on the weight of the vault lid and/or its impacted condition on the roadway. One common way of removing a vault lid is by using a T-shaped bar with a hook which is placed in a designated hole drilled in the surface of the vault lid, and the lid is removed by the person lifting up and backwards until the front edge has been dislodged from the frame. Then the vault lid is pulled from the vault access and dragged on the roadway approximately three to six feet until safely cleared of the vault access. When the underground vault work is completed, the vault lid is dragged from its resting position and securely placed back in the vault access opening. Not only is this a time consuming operation but the physical task involved often results in back and other musculoskeletal injuries to the work crews. Mr. Alvin Neeley, my co-inventor and I undertook the design and construction of a vault lid removal apparatus which is the subject matter of our above noted application.

4. Prior to 1994, Mr. Neeley and I conceived the idea of a design for a vault lid lifting apparatus, such as described in the above noted application, and began developing a prototype. By January 11, 1994, a fully functional prototype had been constructed and tested, and this was fully documented in a five page document which is attached to this declaration, signed and dated January 11, 1994. Pages 1 and 2 of this document are typed pages, and on the second page, this was signed and dated on January 11, 1998 by Mr. Alvin Neeley and myself, and was also signed by three witnesses, namely Mr. Alvin Neeley Jr., Gerald Munro, and Johnny P. Neeley, Jr. On page 3 there are shown three photographs displaying the apparatus, as described and claimed in the present invention in its operating position lifting a vault cover, and this page is properly witnessed as of January 11, 1994. On page 4, there is shown a test set up measuring the lifting force of the vault, and this is also properly witnessed. On page 5, there are three more photographs showing the apparatus components, and this also is properly witnessed.
5. Subsequent to January of 1994 and continuing through that year and up until the

filing date of, June 12, 1995 of the parent application of the present application, continuing testing and development work was undertaken. As evidence of this, there is enclosed a copy of a letter from Mr. Ed Mekum, Network Crew Chief of Seattle City Light, commenting on the testing which took place on August 29, 1994. The tool was used in the actual working environment and was used to lift vault lids at streets in Seattle.

6. Between January 1994 and June 1995 we continued to field test the tool at Seattle City Light involving various field crews. We continued to modify the tool and changed the design to light weight aluminum for ease of use. We also developed information for our Patent application and sought out a suitable patent attorney for this project.
7. I, Steven M. Davis, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

EXECUTED this 15 day of May, 2000.

A handwritten signature in black ink, appearing to be 'S M Davis', written over a horizontal line.

STEVEN M. DAVIS

Original  
Version

## CONCEPT OF DESIGN

### "NEDA Vault Lid Lifter"

On January 11, 1994, a fully functional prototype of the NEDA Vault Lid Lifter was completed and documented using photographs, video tape, and written form.

The purpose of the NEDA Vault Lid Lifter is to minimize physical strenuous exertion and risk of injury associated with the manual handling and lifting of vault lids or man hole covers. This task is considered to be a significant risk for many occupational (back) injuries. Vault Lids typically weigh 150-550 lbs each, the force to lift them is also increased when the lids are impacted into the roadway by traffic. It is obvious the lifting of such a mass is detrimental to the musculo-skeletal system especially when performed repeatedly.

The NEDA Vault Lid Lifter utilizes a hollow tube steel base frame with two six inch wheels rotated inward 9 degrees and fixed to one end of the frame. This arrangement allows for accurate rotation around a fixed pivot point located on the lifting frame opposite the wheels. One or two fully adjustable lifting jacks attach to the frame for lifting purposes. The jacks are light weight and easily removable for carrying and storage purposes.

The NEDA Vault Lid Lifter is designed and intended to be placed directly over the vault access in order to attach and remove the vault lid. The lifting jacks should be placed into the horizontal slot of the lifting frame so that they are oriented perpendicular to the frame and the vault lid pick holes. Therefore, the line of lifting force is perpendicular to the lifting frame and the vault lid, and in-line with the affixed lifting jacks to achieve maximum lifting force.

The NEDA Vault Lid Lifter is secured to the vault lid or man hole cover using a bent lifting hook or a split pin which is placed into designated holes or grates of the vault lids. The lifting jacks are operated to lift vault lids using a manual crank, ratchet or power tool (ie., drill driver, etc.). The vault lid may be raised until adequate road clearance is achieved or until the vault lid is stabilized against the underside of the lifting frame.

Once lifted, the vault lid is easily maneuvered away from the vault access by rotating the lifting frame and attached vault lid 180 degrees around the stabilized pivot point of the lifting frame. The vault lid may be left in the raised position until all vault work is completed and then easily returned back to its original position by rotating the lifting tool 180 degrees.

In cases where a vault lid is being removed on a considerable hill or inclined surface, the lid may be easily lowered to stabilize the lifting unit once the frame and vault lid are rotated clear of the vault access. Stability can also be achieved using a simple wheel block or wedge placed under one wheel. When ready to close the vault access, the vault lid can be rotated back over access, properly aligned, lowered and placed back onto the roadway in an easy and efficient manner.

Inventors:

Witnesses:


This statement is submitted as a simple concept of design and intended purpose of the NEDA Vault Lid Lifter. Currently this tool is undergoing experimental testing and is being continually refined.

  
ALVIN NEELEY  
Primary Inventor

1/11/94  
DATE

  
ALVIN NEELEY Jr.  
Witness


1/11/94  
DATE

  
STEVEN DAVIS  
Inventor

1/11/94  
DATE

  
GERALD MUNRO  
Witness

1/11/94  
DATE

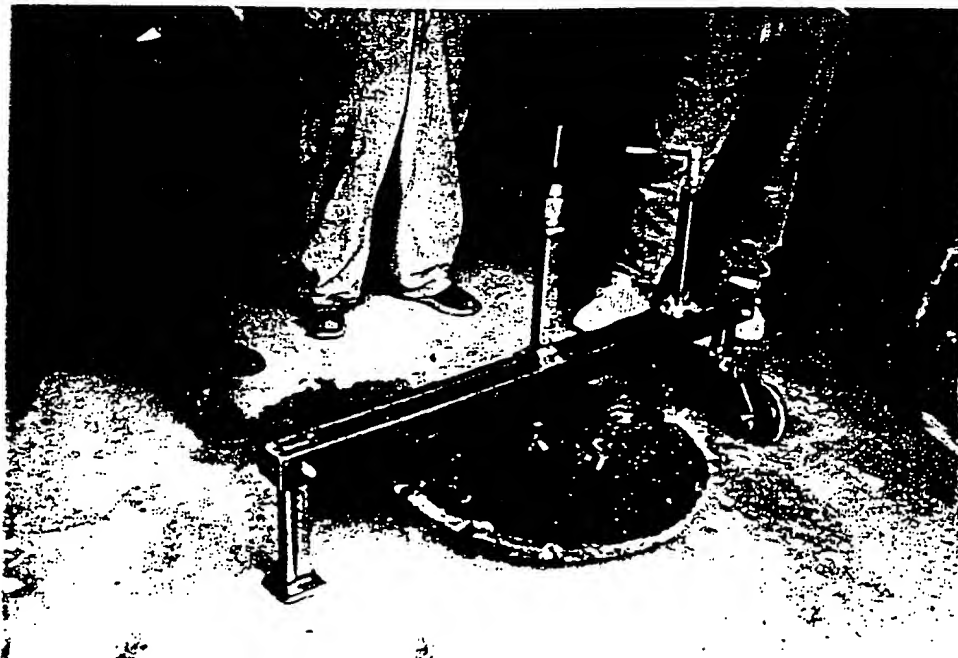
  
JOHNNY P. NEELEY, Jr.  
Witness

1/11/94  
DATE



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FIG 3

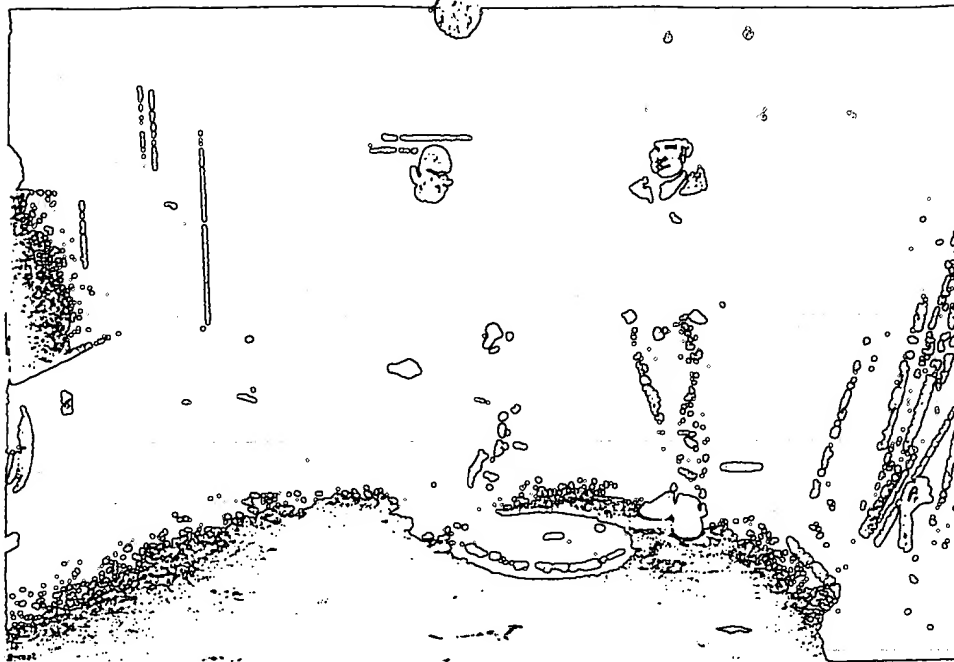


INVENTORS:

J. O. Wilson

WITNESSES: Donald C. Wilson  
Albert J. Kelly

FIG 4



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FIG 5

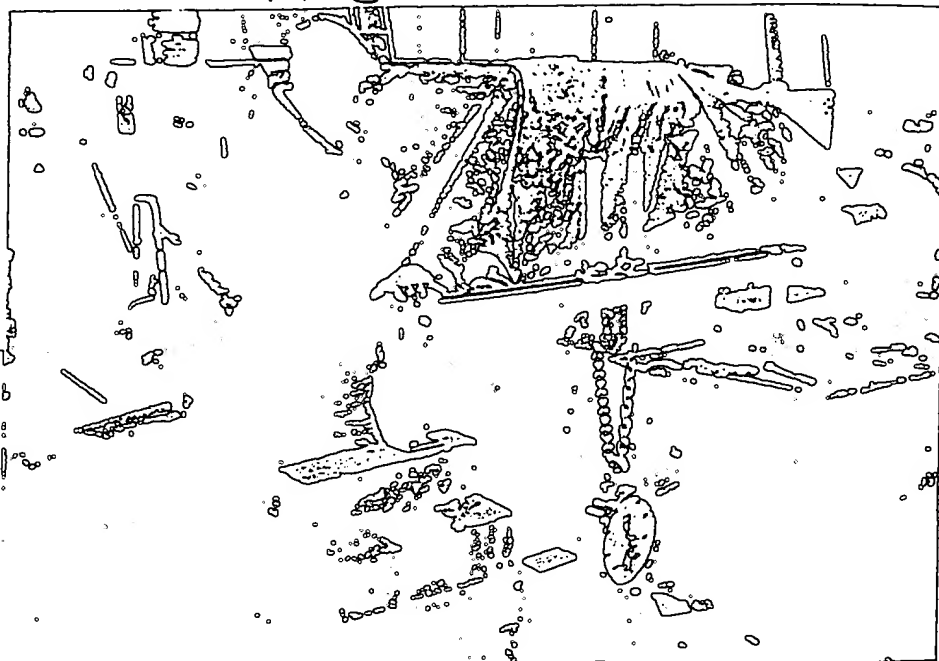
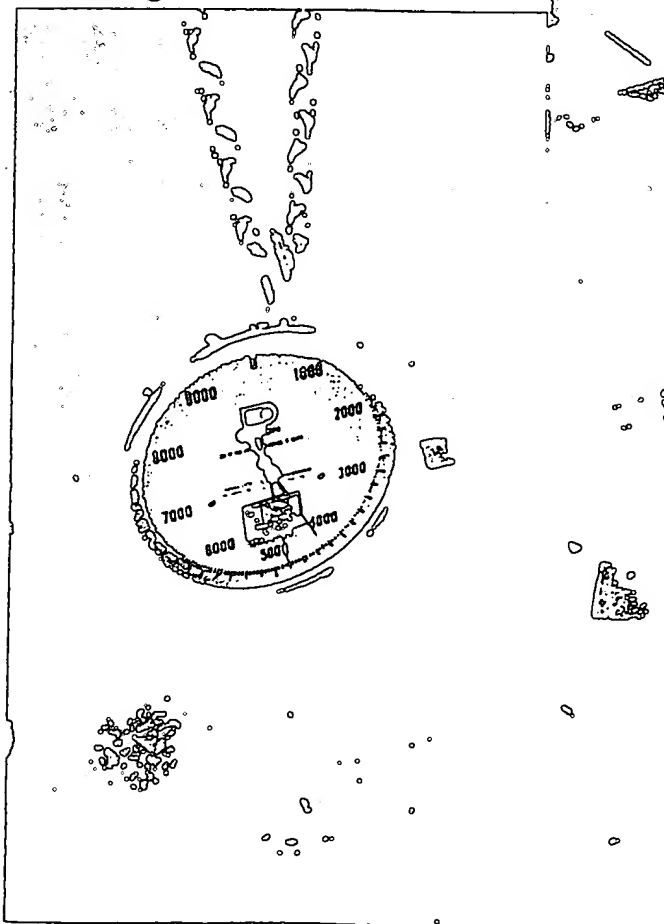


FIG 6



INVENTES :

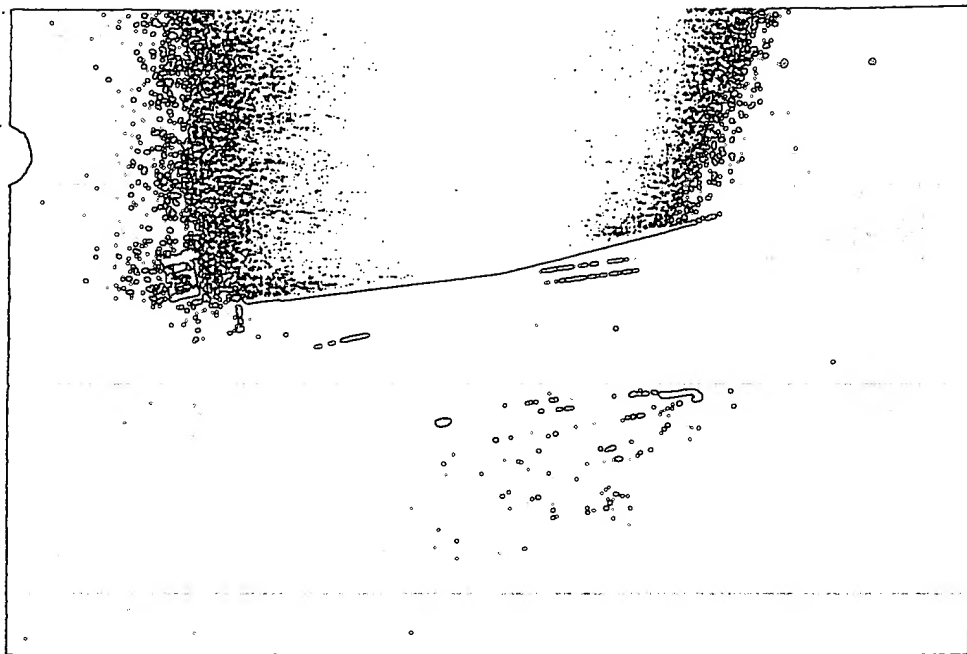
WITNESSES

David J. M.  
1/11/94

Sam x 25 1/11/94

Alvin J. Nelson  
1/11/94

FIG 7



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FIG 8

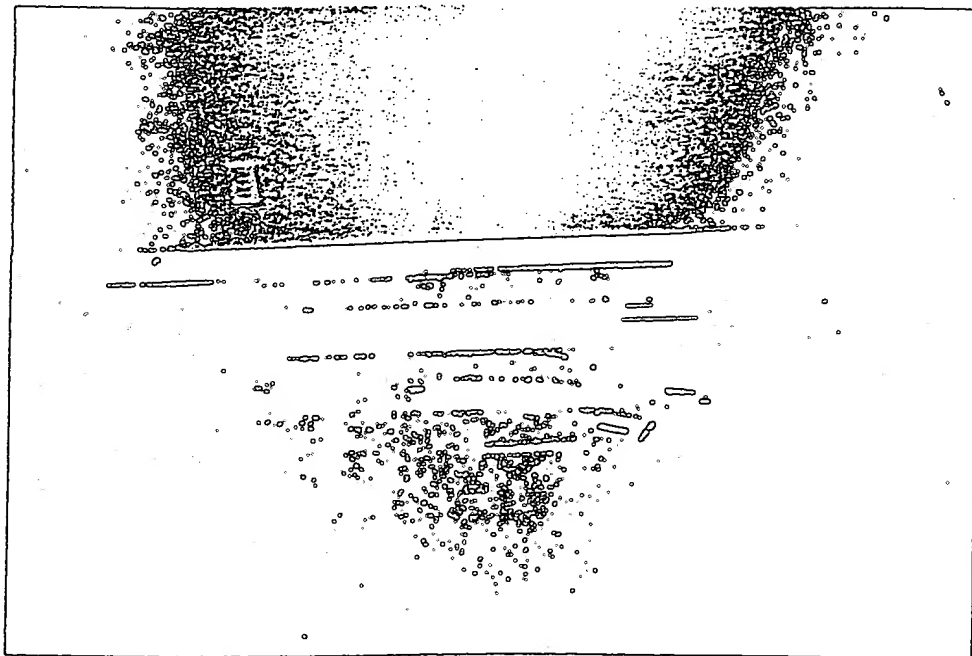
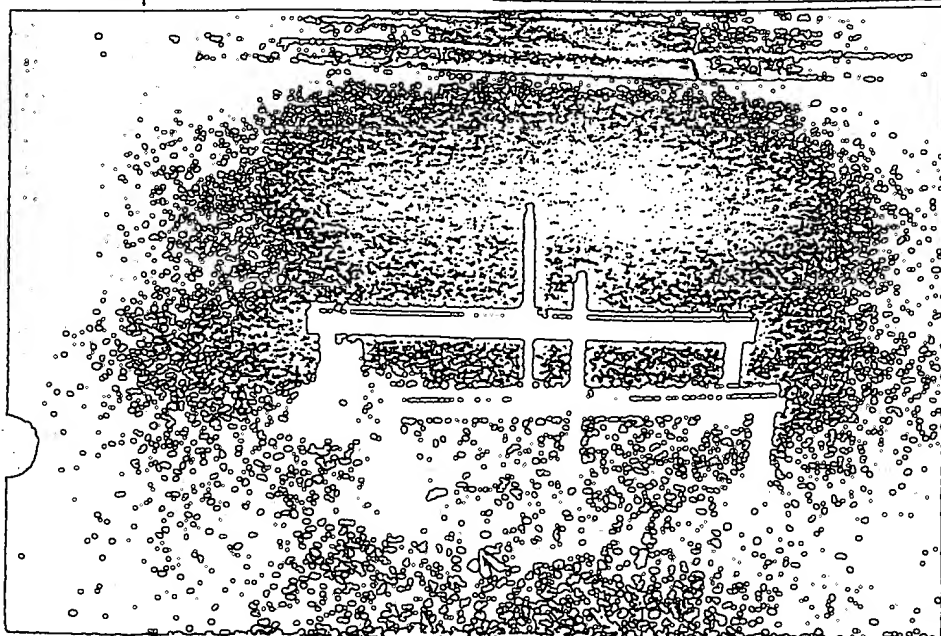


FIG 9



INVENTORS

WITNESSES

Ben L. M.

1/11/94

James L. 1/11/94

Robert M. 1/11/94

1/11/94